

Aug. 3, 1937.

W. IRVEN

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APPARATUS FOR SIZING AND FLANGING SHEET METAL ARTICLES

Filed April 16, 1936

2 Sheets-Sheet 1

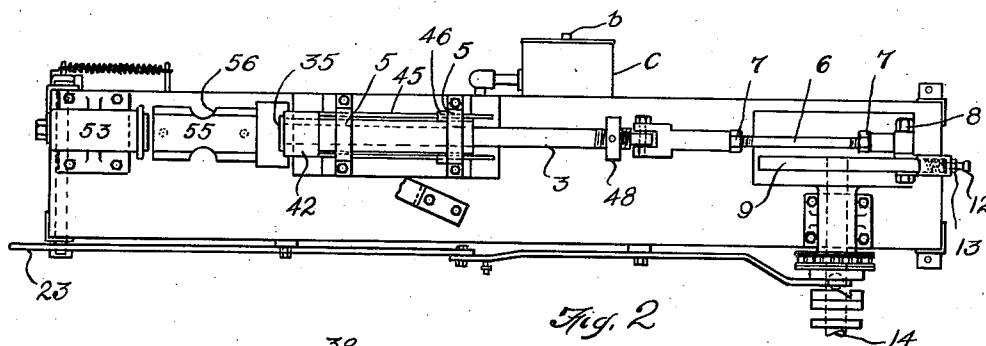


Fig. 2

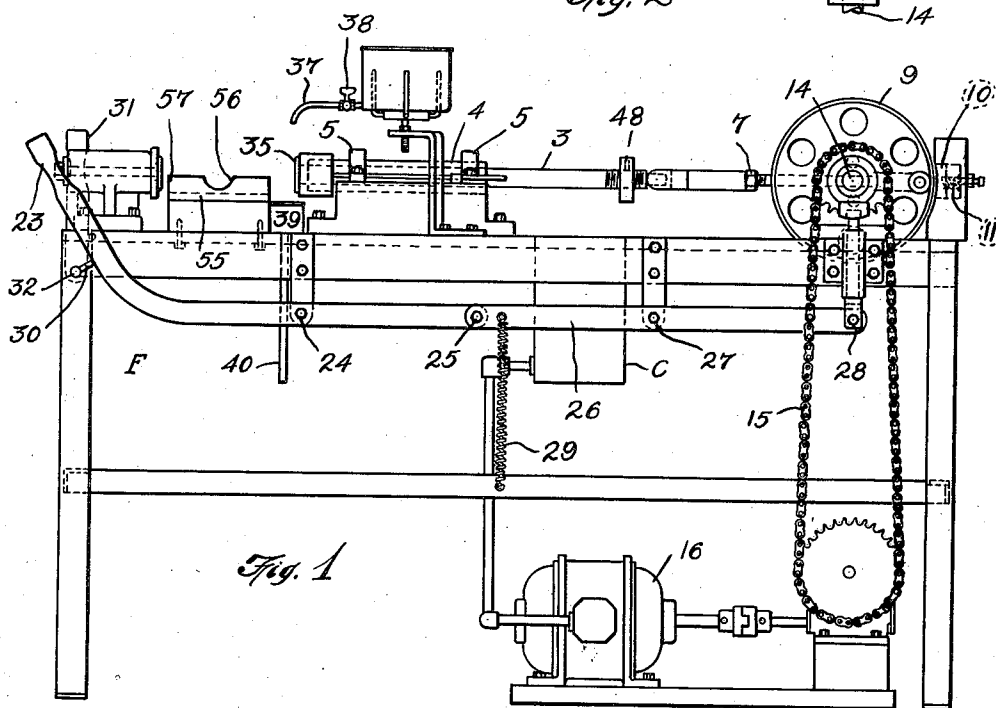


Fig. 1

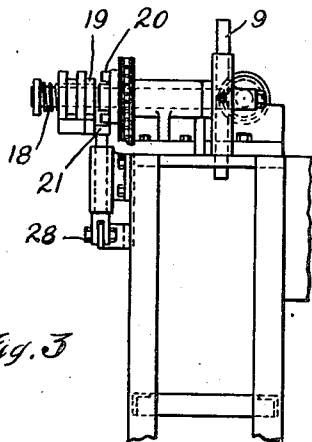


Fig. 3

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2 Sheets-Sheet 2

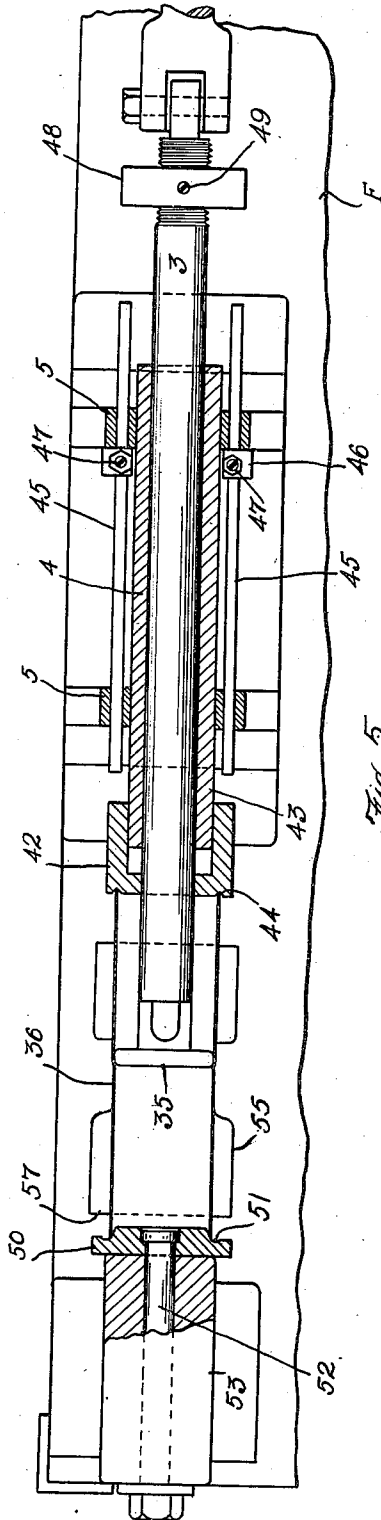


Fig. 5

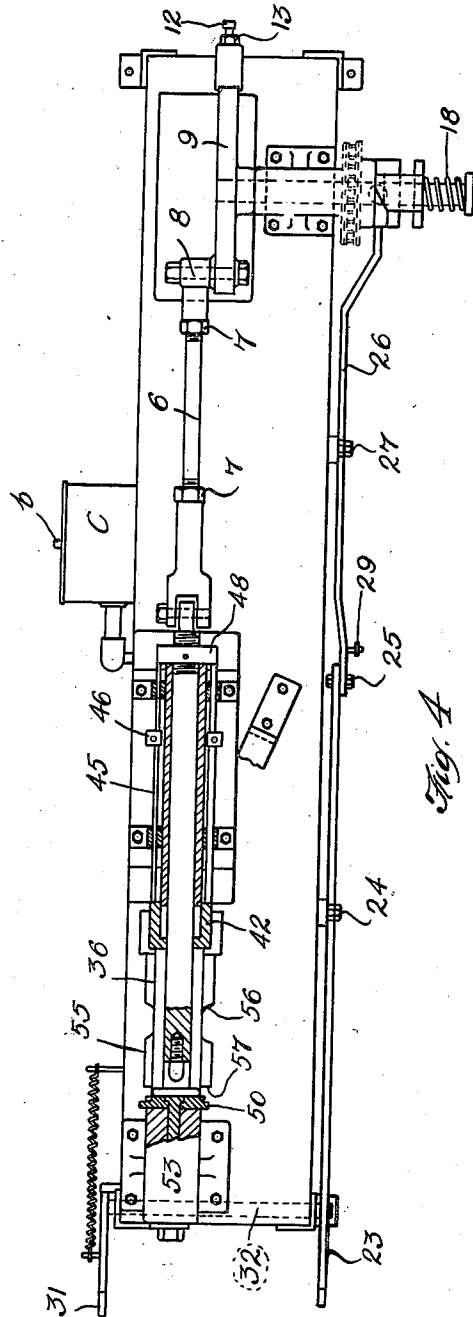


Fig. 4

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UNITED STATES PATENT OFFICE

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APPARATUS FOR SIZING AND FLANGING
SHEET METAL ARTICLESWilliam Irven, Lakewood, Ohio, assignor to The
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12 Claims. (Cl. 153—80.5)

This invention relates to the manufacture of hollow sheet metal ware articles, as for instance container bodies for lubricants; and it is among the objects of the invention to accurately size the internal lumen of the articles. Another object is the formation of desired end flanging. Other objects and advantages will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:—

Fig. 1 is a side elevational view of an embodiment of the invention; Fig. 2 is a plan view and Fig. 3 an end elevation, parts being broken away; Fig. 4 is an enlarged horizontal sectional view on a line cutting chiefly through the axial plane of the ram; and Fig. 5 is a fragmentary further enlargement thereof showing the parts in different position.

Referring more particularly to the drawings, there is shown a frame F, which may comprise a suitable bed and support legs, and reciprocally mounted on the frame is a ram 3 slidably carried in a bearing 4, the latter being suitably secured to the bed, as by clamp-brackets 5. As a means for reciprocally moving the ram, a suitable drive may be applied, for instance a pitman 6, with adjusting means 7 for regulating the effective length of the ram, and a driving crank 8 operating the pitman, being carried by a crank wheel 9. In order to prevent too free over-run of the crank wheel at the end of a desired cycle, a damping means is desirably applied, such as a brake bearing upon the periphery of the wheel, and having a brake-shoe 10 and a pressure-spring 11, screw-threaded means 12, 13 serving to control the amount of pressure on the brake-shoe. The shaft 14 of the crank wheel may be driven for instance by sprocket chain 15, through suitable reduction gearing from a motor 16, and convenient control of the latter may be had by a controller box C within the reach of the machine-operator. Interposed between the motor-drive and the crank wheel shaft is a clutch, whose detail may vary as preferred, but which may comprise a clutch spring 18 and engaging clutch members 19, 20, while a hold out roller 21 is arranged to be moved up and down into position

to engage the clutch member 19 and hold it out, according as the control-lever is operated. The latter may comprise a hand lever 23 fulcrumed at 24 and pivotally connected at 25 to a secondary lever 26 which is fulcrumed at 27 and pivotally connected at 28 to a stem carrying the roller. A suitable spring 29 serves to normally hold the lever 26 with the clutch hold out roller 21 in its upper position. As an additional refinement, the control handle 23 may have a stop-lock 30 operated by a control handle 31 through the intermediary of a rock shaft 32.

The end of the ram 3 is provided with a sizing-reamer 35 which is dimensioned to accurately expand to uniform diameter and thereby size, a cylindrical sheet metal blank 36, Fig. 5, being operated on. For lubrication of the reamer, an oil drip means 37, with suitable regulator 38 is arranged such as to apply oil to the sizing-reamer 35 when it is back in its free position, as illustrated in Fig. 1. Surplus oil may be caught by a suitable receptacle 39 and be diverted by a drain 40 to a suitable point of collection.

Carried also by the ram 3 is a blank-engaging or drive collar member 42, this having a slight slidable range of movement also on the projecting tubular end 43 of the ram bearing member 4. The collar 42 is desirably provided with an annular groove 44 for more accurately holding and controlling the end of the sheet metal cylindrical blank 36. Forward movement of the blank-drive collar 42 is provided in connection with the ram, and desirably may involve push rods 45 slidably mounted in the supports 5, and having tappets 46 with set-screw adjustment 47 whereby to control the extent of movement of the push rods relative to the supports 5 in their excursion. By means of a collar 48 on the ram, preferably with screw-threaded mounting thereon, and a set-screw 49 to retain the adjusted position, the collar 48 may be regulated in its setting on the ram, so as to engage the push rods 45 in controlled timing and amount for thrusting the collar 42 and the hollow cylindrical blank 36 forward against an end-abutment 50 which is stationarily held on the frame. By the provision of an annular flange-turning groove 51 on the abutment member, a flange may be formed on the end of the sheet metal blank at the same time that it is sized internally. A convenient mounting for the abutment member 50 may comprise a holding bolt 52 in support bracket 53.

Interposed between the abutment member 50 and the sizing-reamer 35, in open position, is a work holder or work support 55, suitably notched

as at 56 to permit easy handling of the blank, the work support being in a general form of a shallow trough axially oriented with respect to the line of travel of the ram. By the provision of a stripping abutment 57 on the end of the work support, the flanged tube as formed by the stroke of the ram is immediately loosened from the ram on its return movement, and may be quickly lifted aside by the operator.

The operation involved is readily understood from the foregoing. With the motor started by pressing the appropriate starter button b on the controller box, and the clutch lever 23 thrown down to allow the clutch to engage, and the ram 3 being in its rear position, the operator lays a cylindrical or tubular blank 36 in the work support 55, and the ram then advances, pushing the sizing-reamer 35 into the lumen of the blank and the end of the blank is steadied by the advance of the collar 42 and at its far end by engagement with the abutment member 50. The sizing-reamer 35 is thus pushed progressively through from one end to the other, and the walls of the blank slightly expanded and sized to the standard diameter. Toward the end of the movement, the push collar 48 on the ram strikes the push rods 45 and causes these to force the collar 42 and the blank 36 forwardly sufficiently to form a flange on the end of the blank as it follows the contour of the abutment member 50 with its flanging shaper 51. The ram then recedes, pulling the sizing-reamer 35 out of the tube as the flange of the latter strikes the stripper 57, and the tube is left free in the trough of the work support, whereupon the operator may throw it aside and place a fresh blank in position.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the character described, a frame; a ram reciprocatively mounted thereon; means for reciprocating said ram, including a crank wheel and a continuous type drive means, a clutch and a lever for controlling said clutch; means for locking said lever; damping means for the crank wheel, including a brake shoe and pressure spring and adjusting screw means; means for regulating the length of said ram; a sizing reamer on the free end of the ram; means for lubricating said sizing reamer, including a regulable oil drip thereover and a catch receptacle underneath; a blank-drive collar slidably mounted on said ram; push rods for said blank-drive collar slidably mounted on the framing along said ram; tappets on said push rods regulable with respect to their mounting; a push rod collar on said ram and means for regulating its position on the ram; a stationary abutment member to engage the end of a cylindrical blank being operated thereon; flange-turning means on said abutment member; a work support between said abutment member and said ram; and stripping means on said work support.

2. In mechanism of the character described, a frame; a ram reciprocatively mounted thereon; means for reciprocating said ram, including a crank wheel and drive means and control therefor; means for damping over-run of the ram; a sizing reamer on the free end of the ram; means for lubricating said sizing reamer, including a regulable oil drip thereover and a catch re-

ceptacle underneath; a blank-drive collar slidably mounted on said ram; push rods for said blank-drive collar slidably mounted on the framing along said ram; tappets on said push rods regulable with respect to their mounting; a push rod collar on said ram and means for regulating its position on the ram; a stationary abutment member to engage the end of a cylindrical blank being operated thereon; flange-turning means on said abutment member; a work support between said abutment member and said ram; and stripping means on said work support.

3. In mechanism of the character described, a frame; a ram reciprocatively mounted thereon; means for reciprocating said ram, including a crank wheel and drive means and control therefor; means for damping over-run of the ram; a sizing reamer on the free end of the ram; means for lubricating said sizing reamer; a blank-drive collar slidably mounted on said ram; push rods for said blank-drive collar slidably mounted on the framing along said ram; tappets on said push rods regulable with respect to their mounting; a push rod collar on said ram and means for regulating its position on the ram; a stationary abutment member to engage the end of a cylindrical blank being operated thereon; flange-turning means on said abutment member; a work support between said abutment member and said ram; and stripping means on said work support.

4. In mechanism of the character described, a frame, a ram reciprocatively mounted thereon; means for reciprocating said ram, including a crank wheel and drive means and control therefor; means for damping over-run of the ram; a sizing reamer on the free end of the ram; means for lubricating said sizing reamer; a blank-drive collar slidably mounted on said ram; push rods for said blank-drive collar slidably mounted on the framing along said ram; tappets on said push rods regulable with respect to their mounting; a push rod collar on said ram; a stationary abutment member to engage the end of a cylindrical blank being operated thereon; flange-turning means on said abutment member; a work support between said abutment member and said ram; and stripping means on said work support.

5. In mechanism of the character described, a frame; a ram reciprocatively mounted thereon; means for reciprocating said ram, including a crank wheel and drive means and control therefor; means for damping over-run of the ram; a sizing reamer on the free end of the ram; means for lubricating said sizing reamer; a blank-drive collar slidably mounted on said ram; push rods for said blank-drive collar slidably mounted on the framing along said ram; a push rod collar on said ram; a stationary abutment member to engage the end of a cylindrical blank being operated thereon; flange-turning means on said abutment member; a work support between said abutment member and said ram; and stripping means on said work support.

6. In mechanism of the character described, a frame; a ram reciprocatively mounted thereon; means for reciprocating said ram, including a crank wheel and drive means and control therefor; means for damping over-run of the ram, a sizing reamer on the free end of the ram; means for lubricating said sizing reamer; a blank-drive collar slidably mounted on said ram; a stationary abutment member to engage the end of a cylindrical blank being operated thereon; flange-turning means on said abutment member; a work support between said abutment member and said ram; and stripping means on said work support.

ram; and stripping means on said work support.

7. In mechanism of the character described, a frame; a ram reciprocatively mounted thereon; means for reciprocating said ram, including a crank wheel and drive means and control therefor; means for damping over-run of the ram; a sizing reamer on the free end of the ram; means for lubricating said sizing reamer; a blank-drive collar slidably mounted on said ram; a stationary abutment member to engage the end of a cylindrical blank being operated thereon; flange-turning means on said abutment member; and a work support adjacent.

8. In mechanism of the character described, a ram reciprocatively mounted; means for reciprocating said ram; a sizing reamer carried by said ram; means for lubricating said sizing reamer; a blank-drive collar on said ram; a stationary abutment member to engage the end of the cylindrical blank being operated thereon; and flange-turning means on said abutment member.

9. In mechanism of the character described, a ram reciprocatively mounted; means for reciprocating said ram; a sizing reamer carried by said ram; a blank-drive collar on said ram; a stationary abutment member to engage the end of a cylindrical blank being operated on; and flange-turning means on said abutment member.

10. In mechanism of the character described, a ram reciprocatively mounted; means for reciprocating said ram; a sizing reamer carried by said ram; a drive collar slidable on said ram for forcing a cylindrical blank axial-wise; push rod means for said drive collar; means movable with said ram for regulably actuating said push rod means; and an abutment member to engage the end of the cylindrical blank being operated on.

11. In mechanism of the character described, an internal sizing reamer; a reciprocative member carrying said reamer; drive collar means on said reciprocative member for forcing a cylindrical blank axial-wise; means for regulating the throw of said drive collar means relative to said reciprocative member; and a flanging anvil to form a flange on the ends of the cylindrical blank being sized.

12. In mechanism of the character described, an internal sizing reamer; a reciprocative member carrying said reamer; regulable throw drive collar means actuatable by said reciprocative member for forcing a cylindrical blank axial-wise; an abutment member to engage the end of the cylindrical blank being operated on; and flange-turning means on said abutment member.

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